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Naturalising Space

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Introduction

Space is a consequence of social cohesion, effected through constraints and processes of enaction which are (fundamentally) semiotic. The argument put forward in this paper is that space is a sign because it is a reciprocal condition of unfolding engagement in the world, which once produced affects in the manner of another sign: i.e. that space is constituted as created and creative. On the one side space is a determination (it is produced). On the other it is a representation, which is perceived and thereby affects the observer (it is productive). See figure 1. This argument is predicated on the theoretical biology of Jacob von Uexküll, the bio-cybernetic thinking of Gregory Bateson, the semiotic logic of Charles Peirce and Henri Lefebvre's notion of the social production of space. A biological definition of space and organisation is presented on the basis that the spatiality of an organism is generated through its capacity to sense, and that this offers a new definition for 'architectural-space' tying people, society and environment together on the basis that 'biological-space' underpins architectural-space.

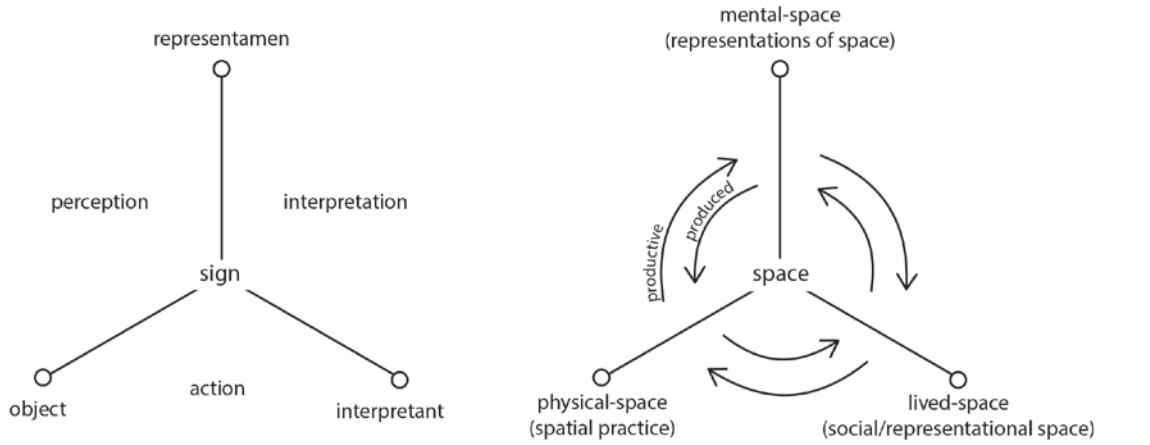

Figure 1: The triad on the left is a development of the semiotic triad of Charles Peirce (Määttänen 2007), which is coupled with the tri-dialectic spatial code of Henri Lefebvre (1995) on the right to illustrate how, as a consequence of being-in-the-world, space is a phenomenon which is both produced and productive: i.e. space is a sign.

The problem: the typical 'perception' of space in architectural practice

Spatial problems are complex. A key obstruction in current architectural practice is the general reliance on traditional methods which tend to flatten spatial problems into something quantifiable so they can be managed and planned. Everyday life and the world around us are not determinable, reducible or linear. Approaching the configuration of space in the standard way raises the question whether any richness is lost? There is often a qualitative disconnect between the articulation of spatiality in the built environment and the spatiality of being. The world has become mathematized; hence spatial properties of the environment can be depicted patently through practical measurements such as dimension, distance, angle, area, shape, and so on. These can be considered in terms of symmetry (reflection, rotation, subtraction and addition, offsetting and so forth) and asymmetrical relations, providing the capacity to communicate and manipulate our mental and physical environment. These simple operands, their adaptation and manipulation, can be utilised in solving spatial problems without questioning the issue of space. This is because they provide a cognitive basis for ordering and manipulating the environment, allowing us to manage everyday spatial tasks. More importantly, they allow us to communicate past, current and future spatial scenarios. Spatial problems are inherently situated in the world,

which we manage and solve within the confines of geometry. This is the strength of geometry: that it states general laws about geometrical objects and scenarios that we can then apply back to the real world. In a sequence of lectures on 'The Relation of Space and Geometry to Experience' Norbert Wiener claimed that "geometry is the science of a 'form' into which we cast our spatial experiences" (Wiener 1976, p95). Space, he argues, is experiential and that geometry is an abstraction of that experience, being a set of rules by which experience may be replicated.

Biological Roots

The spatiality of an organism is generated through its capacity to sense, and this, when extrapolated, has implications for the manner in which space is perceived and experienced. By engaging with the spatiality of an organism-in-its-environment the divide between mental, physical and lived-space may be transcended. Space as lived must be tallied with the traditional conceptualisation of mathematized space because whilst space has geometrical and topological characteristics it is actualised through behaviour. There is a binding connection and reciprocal influence between the environment of an organism and its behaviour which affects an organism's being and the activities it performs. As such there is a structural coupling between intention and the environment, in much the same way that space as lived and mathematized space are two-sides of the same coin. Architectural-space may thus be derived from the properties of unity between an organism and its environment. The premise is therefore that some characteristics of space comply with those of a complex adaptive system which produces its own organisation, in response to differences in its environment.

Deemed to be a primitive condition created through interaction, space emerges and fluctuates as a result of a perceiving entity's interpretation (which is conditional on the entity's state) of its surroundings and the effect of this impression on the environment: a cyclical process of feedback between internal and external factors which coalesce to effect action (Uexküll 1926). A morphological process characterised by 'intentionality' space has organisational and experiential properties. It is organisational in the sense that it orients and affects future action: a form of telos. The experiential aspect of space is phenomenological, affected by the state of the observer and the context in which the observation is made; leading to action. Phenomenological concern for the experiential effect of space revolves around mental space whilst the structuralist focus on the configurational aspect of space is concerned with the physicality of space. Henri Lefebvre recognised the mental and physical aspects of space as intertwined and mediated through what he called spatial-practice; referring to habitual tendencies cast into the artefacts and structures we inhabit. In other words, lived-space is the assimilation of physical and mental space. His 'code' expresses a tri-dialectic process whereby space is created and creative effected through the relations between subjects, their space and surroundings, meaning space is social because it unfolds through interaction. A view informed by the notion that the world is self-organising and emergent, or as Lefebvre would say consisting of rhythms and patterns. Frustrated with binary theories Lefebvre shunned the semiotics of his milieu as "promoting the basic sophistry whereby the philosophico-epistemological notion of space is fetishized and the mental realm comes to envelop the social and physical ones" (Lefebvre 1995, p5). Resulting in space reduced to a mental concept, he protests the body is abstracted to 'a simple mediation between subject and object', as opposed to a practical, fleshy body 'conceived of as a totality complete with spatial qualities'. As a social product "[s]pace is neither a 'subject' nor an 'object' but rather a social reality – that is to say, a set of relations and forms" (ibid p116). Emphasising the social dimension of being in the world Lefebvre stresses interaction is both mental and physical. "Space is social morphology: it is to lived experience what form itself is to the living organism, and just as intimately bound up with function and structure" (ibid, p94).

Space as an Enabling Constraint

Everything in the physical everyday world is spatial, and through constraints is creative. The presence of something is productive because it affects something else. The organisational aspect of space is classified here as having low-dimensional properties, referring to constraints which are rudimentary: effecting direction and distance in a relational sense. The phenomenological aspect is perceived as high-dimensional, because being experiential the factors are poly-dimensional. Conversely, these –dimensions may be equated to Peirce's categories of Firstness and Secondness. In this sense the high-dimensional properties of space relate to Firstness and the low- to Secondness. "The mode of being of Firstness, is the embryo of being" (Peirce 1998, p269), relating to 'possibility' and the basic manner in which some quality is sensed: such as the effect of light falling through an opening at a certain time of the day. Being rudimentary the low-dimensional properties are brute-facts, whereby actual existences and effects arise out of their relation to other things. The mediation of Firstness/high-dimensional properties of space and Secondness/low-dimensional result in space as lived or in Peirce's terms 'Thirdness', being the regularities and habits of the organism-in-its-environment. Habitual tendencies are cast into the artefacts and structures organisms create: what Lefebvre called 'spatial practice'. "The spatial practice of a society secretes that society's space; it propounds and presupposes it, in a dialectical interaction; it produces it slowly and surely as it masters and appropriates it" (Lefebvre 1995, p38): resulting in what may be referred to as niches of habitation. Organised by purposeful activity, an organism's niche is a

habitual condition effected at one scale by differences across boundaries and scales of composition (Hoffmeyer 1998) and at another by differences to which the organism reacts and has intention towards (Uexküll 1926, Bateson 2000). From a (computer) modelling perspective we can think of an agent which has the capacity to affect and be affected. This agent is spatial and if constituting a part of a system composed of multiple agents (such as a swarm), then its spatiality affects and is affected by the other elements which constitute the system and with which the system interacts. The difference is that the behaviour of the system is collective - as we step up in scale from the individual to the collective, the entities behaviour becomes aggregative. The individual entity is itself a system, having input(s) and output(s), so we are simply referring to how the spatiality of something is affected across scales of composition. An organism's intentionality transcends meaning to define organisation, creating a pattern encompassing bodily structure and behaviour. Conceived to be the embodiment of intellect this purposive space is a pattern, or form of inhabitation and articulates what may be termed the organism's 'spatial intelligence' (van Schaik 2008).

The Semiotics of Space

The Finnish Philosopher Pentti Määttänen coupled the spatial code of Lefebvre with the semiotics of Charles Peirce to establish a method of analysing the concrete interaction of a living organism with its environment (2007). When space is understood to be a sign, this coupling defines a framework for explicating the nature of space and analysing how, in a process of interpretation, we perceive the environment and act in it in order to achieve our goals. As a product of semiosis space is both a determination (created) and a representation (creative). See figure 1. At the level of an organism that does not create artefacts physical-space refers to a pattern of inhabitation; which in Lefebvre's terms, being spatial practice, 'is produced and over time is mastered and appropriated'. In Peirce's terms spatial practice expresses 'the tendency of things to act as they did on a former occasion than otherwise' forming the organism's habits of action. At the level of an organism that creates artefacts these habits of action are cast into the structures produced by the organism, which thus embody the spatial intelligence of the organism. An ant's nest embodies the spatial intelligence of the colony, the web that of a spider and the dam that of a beaver. Having progressed from congregating around fire humankind constructs buildings serving purposes beyond basic physiological needs, such as cultural, personal, artistic expression, and (most lately) sustainability. The absolute existence of space is its physicality, which when considered in retrospect is an expression of spatial intelligence; which for humans culminates as architectural-space.

The interpretant feature of the Peircean triad is intrinsic to this reciprocity because, as a second sign, it leads to a progression whereby step changes may occur; thereby extrapolating the generative aspect of space. The actuality of space escalates from its primal state to its physical according to the three Peircean categories of phenomena. By accepting space to be a sign ingrained distinctions between mind-body, organism-environment, human-other organisms are transcended. In other words space is naturalised and established to be a fundamental condition of being: i.e. that space is a condition of the living because the 'spatiality' of an inert object may be explained through physical properties alone. As a sign, space is a social construct, because it is a consequence of cohesion; meaning effects don't arise between something and itself. The manner in which something holds significance to some other, such as to affect a force, is intrinsic to sociality. That there is some *effect*, between one thing and another, means that these things enter into a relationship, and thus have some form of commonality. We might consider this effect has some value or that it is self-reinforcing, such that it causes habit. 'Social' thus infers some effect, creating cohesion, between two or more things and that this effect is reinforcing. This may be construed as the coupling between an organism and its environment; or those things which the organism shares its environment with. At base we may consider the self-maintaining capacity of a living-cell, which maintains itself by producing its own components, because the components constituting the system (cell) constitute a closed domain of relations specified only with respect to the autopoietic organization that these relations constitute (Maturana and Varela 1980). In other words the system is a unity, by and through its capacity to self-maintain, distinguishing itself from non-self, and so defining its identity, which is "a space whose dimensions are the relations of production of the components that realize it" (Maturana and Varela 1980, p88).

A Cell-centric notion of Space

Taking the basic unit of existence to be the organism-in-its-environment (the living-cell being the nascent form), which is coupled to the world through its capacity to sense, and thus interpret its surroundings, 'human-space' may be comprehended (from an evolutionary perspective) by extending the issue downwards to the pattern recognition and control processes of simpler organisms; on the premise that the mechanisms we see at play in single celled organisms lead to higher and higher degrees of sign processing in humans. The spatiality of an organism is affected through its capacity to sense, which underpins perception and capacity to engage with the world. This ability (stemming from our cells) is ambient and distributed, and from this perspective space is 'lived'. Effected through the ability to feel or perceive and affect the environment, space is a (habitual) state of fluidity and perpetual readjustment articulated through an organism's activity and interaction. A living-cell is, fundamentally, a semiotic-niche; meaning it must master a set of signs by which it can control – or maintain –

itself (Hoffmeyer 1998), and like all living things acts according to physiological and social needs. Having the capacity to distinguish self-from *non*self a cell is, thus, a model of the ontology of 'self' (Weber 2009). The spatiality of an organism and its engagement with its surroundings may thus be extrapolated on the basis of cell/niche (inter)action – after all an organism is, at base, an ecosystem of cohabitating cell formations (Hoffmeyer 1996).

Conclusion

We may therefore conclude that space (as a sign) is a condition pertinent to an organism's semiotic freedom, which is articulated by the organism as a consequence of its capacity to manipulate the world in the course of its unfolding interaction with its environment. On the basis that it is the habitual tendencies of an organism which are cast into the artefacts and built structures they create we may extrapolate these structures as embodying patterns, of patterns of patterns, of meta-patterns, and so forth, of inhabitation which pertain to the capacities of the organism: i.e. increasing semiotic freedom leads to greater spatial intelligence which leads to more complex patterns of inhabitation, and thus the formation of artefacts pertinent to the organisms being. Recognising space as a sign is an ontological view of the spatiality of being, and enables designerly thought the freedom to think about the configuration of concrete space in relation to the practice of everyday life.

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